

Mechanical Differences Between Sexes During A Jump Landing

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ABSTRACT

Jump landings are a frequent occurrence in both male and female sports. However, aberrant landing mechanics, such as landing with smaller knee flexion angles (KFA), can increase the likelihood of knee joint injury. Previous research suggests males and females demonstrate different landing mechanics, which could explain the higher incidence of knee injuries in females, such as anterior cruciate ligament (ACL) injury. **PURPOSE:** The purpose of this study was to compare lower extremity landing biomechanics associated with ACL injury between males and females. We hypothesized that females would land with smaller KFA and greater knee abduction angles (KAA) compared to males. **METHODS:** Landing biomechanics were assessed in 15 males (23.46±2.75 yrs, 1.77±0.06 m, 77.81±14.01kg) and 15 females (21.24±1.99 yrs, 1.63±0.06 m, 63.15±12.19kg) during a jump landing task. All participants had experience playing sports that required jumping and landing. Separate independent samples t-tests were used to compare KFA at initial contact, knee abduction angle (KAA) at initial contact, peak KFA, and peak KAA between males and females. **RESULTS:** Males demonstrated larger KFA at initial contact compared to females (16.52±4.55° vs 12.85±4.91°, p=0.04), but smaller KAA at initial contact (3.13±2.07° vs 0.93±0.52°, p<0.01). Males also demonstrated larger peak KFA compared to females (103.41±16.80° vs 91.88±10.71°, p=0.03) and smaller peak KAA (-2.97±2.0° vs -6.49±4.11°, p=0.004). **CONCLUSION:** The landing mechanics demonstrated by females may be problematic, as smaller KFA when landing have been associated with higher forces being absorbed, increasing the odds of ACL injury. Furthermore, females also demonstrated greater KAA, which have also been linked with traumatic knee injury. Therefore, females participating in sports involving landing from a jump could benefit from interventions that aim to improve landing kinematics.